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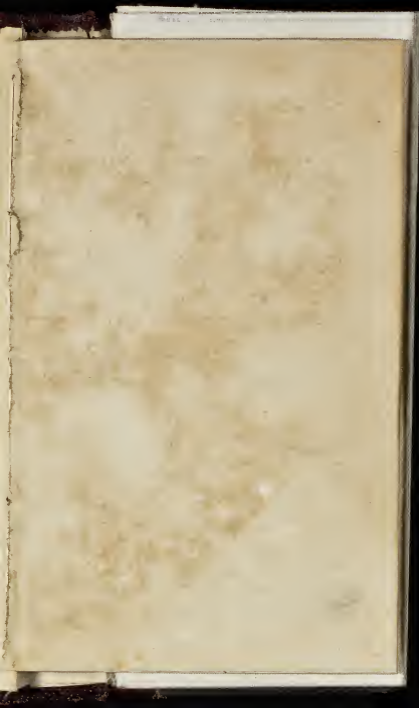
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OF THE

WHITE PINE MINES

AND THE

REGIONS ADJACENT,

WITH AN

ESSAY ON THE GEOLOGY AND VEIN SYSTEM OF THE
DISTRICT AND THE CHARACTER OF THE SUR-
ROUNDING COUNTRY, ACCOMPANIED WITH
TABLES OF HIGHTS, DISTANCES, BULL-
ION PRODUCTS, ETC.

BY

TAGLIABUE & BARKER.

SAN FRANCISCO:

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THE WHITE PINE MINES.

Position, Topography and Altitude of the District.

THIS district, which covers an area of twelve miles square, lies in the southwestern portion of the county of White Pine, State of Nevada. The surface of the country is greatly diversified by mountains, hills and valleys. Striking north and south across the westerly margin of the district is a lofty, isolated ridge, about eight miles long and five miles wide. It constitutes an outlying spur of the main White Pine chain, and has latterly come to be known as the Pogonip Mountain, and forms, in conjunction with two lower and parallel ridges, lying to the east of it, what is termed the Base Metal Range. Between the latter and the main White Pine range interposes another bold and isolated eminence named Treasure Hill. This hill, which has a length of six by a breadth of three miles, is the locality of the principal mines. It has an absolute elevation of about 9,000 feet, being 1,500 feet lower than the crest of the Pogonip Mountain, and about an equal distance above the valley that surrounds it—the mean altitude of the district being about 7,500 feet. The position of this hill is found to be in latitude 39 degrees 28 seconds north, and in longitude 115 degrees 40 minutes west from Greenwich. It is distant from Elko, nearest point on the Central Pacific Railroad, 110 miles, due south, and from Great Salt Lake City about 300 miles, in a W. S.W. direction. Its easterly and westerly slopes are craggy and precipitous, its northern and southern falling off with more gentle declivities. It is an entire mass of dolomitic limestone, mixed with bitumin-

ous shales and silicious rock; its geological composition, its ore deposits and vein system, being comprehended in the following able essay by J. E. CLAYTON, published originally in the *Mining and Scientific Press* of San Francisco.

Treasure Hill—Its Geological Age, Formation,

This hill, says Mr. CLAYTON, "is almost exclusively composed of limestone of the Silurian age. The thickness of the limestone cannot be determined closely, for the reason that the upheaval and displacement has not brought to light the underlying strata. Sufficient displacement has occurred, however, to expose a thickness of about 800 feet of limestone, in beds or strata varying in thickness from six inches to twenty feet each. The greater part of the lime rock has been so much changed by chemical action that the fossils have, in a measure, disappeared, leaving only obscure outlines on the weathered surface. Excepting the upper strata next to the overlying slates, three or four species of corallines and a few small bivalves represent the animals of the period in which the limestones were formed. The shales or slates are all more or less bituminous, and in places where they are not much broken or exposed to the air, they contain enough hydro-carbon to burn with a blue flame when heated, until the inflammable gas is consumed. Thus we see the carboniferous rock overlying and in contact with those of the Silurian age.

MECHANICAL DISPLACEMENTS.

"It is unnecessary in this connection to discuss the causes that have produced the breaks in the original bedding of the secondary rocks, for the reason that there are too many causes connected with this subject, and too many diverse opinions to be considered, that have no practical bearing upon the location and extent of the ore deposits. Therefore, in a utilitarian view, it does not matter whether the upheaval of one portion and the corresponding depression of other portions of the metallic rocks were produced by volcanic disturbances, earthquakes, convulsions, or by the corrugation of the outer crust of the earth from the general shrinkage of the interior mass. It is highly probable that the latter proposition—the general shrinkage

the globe from loss of heat'—has been the cause, either directly or remotely, of all the volcanic and earthquake phenomena of ancient and modern times—such phenomena being the result simply of the operation of a universal law.

THE METAL-BEARING STRATA.

"The ore deposits are in what are called 'coraline limestone,' from the fact that corallines and a sea plant called the 'Alge' are the fossils found imbedded in the silver-bearing strata. Next above the silver-bearing limestone is a bed of dark brown and pinkish-colored slate, with alternating strata of limestone of a later period, containing large numbers of 'Encrinites' and a few 'mollusks.'

"This last described stratum of slate and limestone is not metal bearing, and is found only on a few isolated benches on the higher portions of the north end of Treasure Hill, and along the eastern base, extending in a curved line from the town of Hamilton, along the line of Applegarth Cañon, and in the southern foot-hills, south and east of the California mine.

ITS TOPOGRAPHY AND STRATIGRAPHY.

"The longitudinal axis of Treasure Hill is in a line nearly north and south, and from Hamilton at the extreme north to the junction of Applegarth and Shermantown Cañons at the extreme south, the distance is about six miles. A line from east to west, through the widest part of the hill, cutting to the South Aurora Mine, will measure about two miles. The high crest of the hill is about one mile long, north and south, and averages about 1,200 feet in altitude above its base. This high crest forms an irregular sloping bench, highest along the east side, and sloping irregularly westward.

"For convenience, we will call this the upper plateau of Treasure Hill. It includes Pogonip, Chloride and Bromide Flats, skirting its western slope, and the celebrated Aurora, Hidden Treasure, and other important mines along the higher and more easterly portions, near the summit of the ridge. The eastern edge of this plateau is very abrupt and precipitous, and appears to be the great line of disruption or displacement of the limestone strata. From this line of fracture, the limestone dips westerly at an angle varying from ten to twenty degrees.



"The east side of the hill presents bold cliffs, showing the east edges of the lime strata for several hundred feet down the hill. At the foot of these cliffs the strata, corresponding to that on the 'Upper Plateau,' is found dipping to the east towards Applegarth Cañon.

EAST AND WEST FISSURES.

"At the south end of the 'Upper Plateau' there is a transverse fissure, extending entirely through the mountain in an irregular line from east to west. This I will call the 'Eberhardt Fissure,' from the fact that the great Eberhardt deposit occupies the central portion of this line of displacement. South of this break, the lime strata dip generally in a southerly direction until they disappear under the debris of the foot-hills.

"These are the two most prominent and well marked lines of displacement in the hill, and are the key to all the other lines of fracture and displacement nearly all the other lines of fracture and displacement are immediately or remotely with them.

"South of the Eberhardt fissure the hill is broken into a number of divisions by well marked lines of fracture and displacement, the greater number running in a south and southerly direction, and are now marked by the ravines and cañons which have formed along their lines. (I will here remark that the principal ravine and cañon in this district is formed in a line of fracture in the country rock for at least the greater part of its length.)

"The distribution of fractures south of the Eberhardt fissure cuts the southern part of the mountains into a series of parallel ridges, varying in their direction from south to southerly.

"Across these ridges there are a few fissures nearly parallel with the Eberhardt, and presenting, to some extent, the same general features. The California mine approaches nearly the same structure and general character to the Eberhardt than any other found in the district; with this difference, however,—the California has been in the line of displacement, and is smooth and well marked, whilst at the Eberhardt the north side has been the line of movement, and is equally smooth and well marked. This difference is merely mechanical and does not affect the general similarity of the two mines. The Eberhardt and California mines are not only in lines of fissures east

west, but are also lines of vertical displacement of the strata. The Irvine mine is in a vertical fissure, nearly east and west, in which no material displacement of the strata or bedding of the limestone has occurred. Other fissures of the latter type are to be seen in Treasure Hill and other portions of the district.

LIMESTONE BRECCIA.

"The system of east and west fissures above described, constitutes one of the well marked features of the district, and for convenience I will call it the 'east and west system.'

"The peculiar features of this system are that they are filled, first, by broken fragments of limestone, of all shapes and sizes, from minute fragments to enormous boulders, occupying the entire space between the walls, thus forming a 'breccia' of limestone, in the interstices of which the quartz, spar and ore have subsequently been deposited from solutions containing those minerals and metals in their various combinations.

VEIN CHEMISTRY—'TRUE FISSURES.'

"In many places the 'solfataric action' has been so intense as to dissolve the lime and deposit silica in its place, thus changing the small fragments of limestone into quartz, and in some instances leaving the form of the fossils as perfect in the quartz as they were in the original limestone. Nearly all the quartz associated with the ores of this district has been formed in this manner, and hence is silicified limestone, changed by the same process that in other localities has changed wood into silica, by dissolving the wood and depositing silica in its place, retaining in that case the structure of the grain of the wood. In the transformation of the limestone here, the forms of the fossils are equally well preserved. Hence, the vein-matter filling the true fissures of this district is so different from that observed in other parts of the world, that mining experts have generally asserted that 'there are no true fissure veins here.' I think otherwise; but, as that depends somewhat upon what a 'true fissure vein' is defined to be, I will leave it for future discussion.

THE HORIZONTAL DEPOSITS.

"The next class of ore deposits is those lying with or between the bedding of the limestone, in irregular masses or bunches,

of all sizes and shapes, from a few pounds to hundred. These deposits are in no sense true veins, but are in masses of ore in and between the limestone strata. Flat is a complete representative of this type of deposit. Chemical reactions, however, have been the same in the formation of these 'ore beds' as that described in connection with the filling of the true fissures.

NORTH AND SOUTH ORE CHANNELS—GENERAL LINES OF

"A third class of ore deposits is also well marked throughout the district, that partakes largely of the character of beds above described. They are neither 'true fissures' nor 'calculated deposits,' but are mainly on lines of break, running north and south through the central portions of the district, and no material displacement or faulting of the strata has taken place. The limestone appears to have been crushed and broken into fragments to unknown depths, and in some places to great distances. The finest example of this class is the Aurora Mine, on the summit of Treasure Hill, opposite and east of Chlorine. The crushed or broken limestone has become a great mass of silver ore by the same process as that already described. Chemical changes, induced by the ascent of heated vapors and gases through the rents and breaks of the outer crust, have also spread laterally into and through those strata which are more permeable and soluble; thus changing the limestone in those places where the mechanical and chemical actions operate under the most favorable conditions, into quartz and ore, as we now find it.

"The Mahogany series of claims, including the Banner, are all located on a great deposit of ore belonging to the class of mines of which the Aurora is the representative. This body of ore lies in a basin, along the upper part of Mahogany Cañon, and is traceable about 1,000 feet in length from 100 to 200 feet in width, and judging from the character of the vertical breaks, there is every probability of its continuing to great depth. I do not wish to be understood to say that the whole area of 1,000 feet north and south by 200 feet wide is one continuous mass of ore, but that it is a mass of limestone, with large deposits of ore ramifying it, in the

way that it is seen in the Aurora and other mines of the same class. It is, properly speaking, all one great mine or deposit of Chloride of Iron. It was found in a general line of breakage of the lime-strata. The bedding of the limestone along this line of break does not appear to be displaced or faulted, but is depressed along the central line of break—and hence the dip of the strata on each side of the break is towards the central line, occupied by the bottom of the ravine or cañon, forming a trough like a letter V.

"The superficial character of the explorations along this 'ore channel' can only give a general idea of its extent and value. But it is sufficiently well marked to make it one of the most promising localities in the district, and unless my generalizations are very wide of the truth, it *ought* to be one of the most extensive and valuable mines in this famous and anomalous country."

From the foregoing description it will be seen that the metallic deposits of this hill are not only very eccentric but widely diffused; they having, in fact, been found to exist on every slope and at every level around it. Beginning at its very base we encounter a series of valuable ore beds and channels, extending quite to its summit, establishing a strong probability that they go through, from side to side, and permeate this hill in every part. Like most mountain sections in this part of the country, Treasure Hill is sparsely timbered on all sides but the northeast with a scrubby growth of pine, mahogany and cedar, affording, with similar forests on other portions of the range in close proximity, sufficient fuel to meet all demands likely to arise in the district for many years to come. It is also covered with bunch grass, supplying a good deal of summer pas'urage, though it is entirely destitute of water, none having been obtained, even by digging, except in the ravines about its base. The ores on this hill are remarkable for their purity, only those obtained from the mines near its base carrying any considerable percentage of the inferior metals.

Its Immediate Surroundings.

Flanking Treasure Hill on the west is the Pogonip mountain, constituting with its two outlying ridges on the east the Base Metal Range. These ridges are all timbered with the scrubby

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growth common to the country, besides containing a
of white pine of larger size—a circumstance that origi-
name to both the range and the district. They are
well watered, there being a number of springs along t
and several small but perennial streams flowing thro
cañons. The formation here is also principally lime
the metalliferous lodes, which are quite numerous, an
with more regularity than on Treasure Hill. The
metals found in combination with the silver are lea
iron and antimony; the ore channels being, as a gene
well defined and capacious. To the east of Treasure
the main White Pine range of mountains, the portio
opposite the former being designated Mokomoke Hill
that in the Indian tongue is said to signify moisture,
applied to this locality on account of the springs a
there. It is abundantly clothed with grass though it
but little timber, and, as far as explorations have gone,
tute of metalliferous deposits of value.

A Few of the Leading Mines.

Since anything like an enumeration of the valuable
Treasure Hill would be impracticable, a few only of t
prominent and productive will here be mentioned. Fir
category stands, of course, the far-famed Eberhardt m
taining beyond any question one of the most rich and
deposits of silver ore ever discovered. We find here
channel nearly one hundred feet wide, of unbroken co
in every direction, so far as explored; the present devel
extending vertically 190 and longitudinally several hund
The ore thus far worked, amounting to some 3,000 t
averaged over \$400 to the ton; the product of the mine
present year, with very inadequate facilities for reducti
ing amounted to nearly a million and a half of dollars
means for working the ore, this amount cou'd easily ha
doubled, and that with a very slight increase of outla
dition to the labor force employed.

Next to the Eberhardt, on the list of valuable prop
White Pine, stands the Stanford, or South Aurora mine,
the Hidden Treasure, Consolidated Aurora and Califor

good de admitted to be not much inferior to it in point of value. The Consolidated Chloride Flat Company are also the owners of a valuable group of mines, which, considered as a whole, constitutes one of the best properties on Treasure Hill. This company have erected and own two first class mills, and are in an excellent position to work their mines with economy and profit. The Treasure Hill Silver Mining and Milling Company own three mines of great promise, the Summit, Nevada and North Iceberg. All claims of much intrinsic merit, besides being among the first locations made in the neighborhood—a circumstance that, under the peculiar state of things now existing there, imparts to these mines a double value. This company also possesses the further advantage of having a large and efficient mill of their own, at which their ores are being reduced at the rate of thirty-five or forty tons per day.

Character of the Country adjacent to White Pine.

The following remarks, taken mostly from a small work recently published upon this subject, convey a very accurate idea of the leading physical features of the country contiguous to White Pine :

“Sweeping across the western margin of this district and stretching north a hundred miles to the Humboldt and south nearly double that distance, is a broad depression known as Railroad Valley, so named from the fact that it will be likely to prove the avenue along which will run the projected railroad from Elko to White Pine, as well, also, as for its continuation, should that work be extended further south, as it most likely will be at no distant day. The width of this valley varies from ten to thirty miles, its average width being about fifteen miles. Near the Humboldt River it is reduced to a narrow limit by clumps of low mountains; the chains that bound it laterally crowding in upon it at many other points or contracting it by the intrusion of their foothills. Included within the limits of the valley proper, and stretching along its western margin for nearly a hundred miles, is a low chain of mountains, designated the “Mesa” Range, from the circumstance of portions of it, towards its southern extremity, having a tabulated form. Along this section of the valley its true western rim consists of the

Diamond Mountains, with the Hot Creek Range further the several chains that bound the remainder of it bounded on the accompanying map. From the base of the mountains that skirt this valley laterally, the surface declines towards its center, this being a feature of all the great basins of the State.

The Railroad Valley is separated into numerous shallow basins the divides between which have generally so slight an elevation above the main level as to be scarcely perceptible. They often receive the drainage of a large scope of country, sometimes as much as ten or fifteen hundred square miles of drainage, usually settling near the center of these basins to create there what are known as

ALKALI FLATS AND MUD LAKES,

These localities being identical. During the melting of the snow in the spring and the period of the early summer the porous earth being unable to absorb all the water that falls, plus, collecting on the surface, forms the Mud Lake; not more than a few inches deep though often many miles in extent. The earth throughout this region being impregnated with various salts, the latter are conveyed by the water and deposited in this general receptacle. On the occurrence of dry weather these mimic lakes disappear, leaving the dissolved salts spread out in the form of a thin incrustation on their desiccated bottoms, converting them into Alkali Flats, thus to remain till the return of wet weather restores them to their lacustrine feature. Viewed from even a short distance these shallow lakes have every appearance of deep lakes, the water, while being clear and almost always placid, the surrounding mountains with the greatest distinctness. It is not until the traveler, if a stranger, has ridden in and finds that they take his horse scarcely above the knees that this illusion as to their depth is effectually dispelled. The saline incrustations vary in thickness from a mere film to three inches, being composed in some cases almost entirely of soda and in others of nearly pure salt. In the latter they form what are denominated

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SALT BEDS OR MARSHES,

Of which there are a number at different points along this valley. Compared with others found elsewhere in the State, these beds are of limited extent and the salt of inferior quality for culinary or other domestic uses, being considerably mixed with alkaline matter. This, however, so far from depreciating is said to rather enhance its value for reduction purposes; the salt obtained from the deposits in this valley having been used in the mills about White Pine with entire satisfaction. The localities from which the most of the article thus far used at White Pine has been obtained are Butterfield's and McDonald's Salt Beds, situate, respectively, forty-five and fifty-five miles south of Shermantown.

AREA, SOIL, VEGETABLE PRODUCTS, AGRICULTURAL AND GRAZING CAPACITIES OF THE GREAT VALLEY.

“From what has already been said in regard to the size of Railroad Valley, it embraces, as will be seen, a vast area within its limits—not less, including the foothills and lower slopes of the mountains adjacent, than 6,000 square miles; the whole of which, with the exception of the Mud Flats already described, some narrow strips of alluvial soil fringing the mountain streams and a few inconsiderable tracts of mountain meadow, consists of sage lands, rescued from utter barrenness only by the sparse growth of bunch grass and a species of the artemisia, upon which cattle feed in the winter, found growing upon a large portion of it. The soil covering considerable sections of this valley is a deep, rich, friable loam, formed by the alluvial wash from the mountains and the decomposition of the surface earths, under the joint influence of the sun and other disintegrating and fructifying agents; and, with the aid of careful irrigation, produces most kinds of cereal and vegetable crops with certainty and abundance. Many extensive spots in the valley, too sterile to grow the bunch grass or wild sage, present a surface destitute of even the lowliest form of vegetation, precluding the hope that they could ever be rendered fruitful through any practical method of artificial assistance. Other large spots, more especially the Alkali Flats, become so soft that it is difficult and often impossible for animals to cross them in wet weather.



During the dry season these Alkali Fla's are, on the other hand, hardened that a wagon tire or a horse's hoof leaves scarce impression upon them, while other districts, not indurated by saline depositions and standing water, become so friable that the animal's foot sinks deep into the soil, rendering travel to them slow and toilsome.

"Except at its northern end along the Humboldt River, where the few streams entering it, this valley is destitute of timber, there being not a willow of any size or a cottonwood or a straggling gore of piñon anywhere along it. In some instances the growth of scrubby pine reaches down almost to the base of the mountain, but nowhere enters the valley proper.

"The only bodies of land of any extent adapted to farming in the valley are found near the Humboldt, bordering the Alkali Flats as are covered in part by permanent water, several of the larger springs and along a few of the streams that enter it at different points; the entire amount aggregated perhaps, fifty thousand acres out of an area of little less than 3,000,000. Along many of the mountain rivulets and at points where they debouch upon the plains exists narrow strips of good soil, which, being susceptible of easy irrigation, may readily be converted into orchards, gardens, vineyards, etc., and for stock-raising the capacities of the valley, if we include the pastures of the adjacent mountains, are much greater than for agricultural purposes; the summer pasturage consisting of the grass ground growing nearly everywhere on the mountains, though less abundantly, in many parts of the valley; while the white sage and the natural meadows are sufficient to sustain a good deal of stock during the winter.

ITS SPRINGS AND STREAMS.

"Neither of these are numerous, though some of the largest are remarkable for their size and other peculiarities. Except the Humboldt River and some of its tributaries flowing into it from the south through this valley, the latter is destitute of any stream of magnitude; though many mountain rills reach its margins they disappear, only a few, such as Pinto, Bull, Duckwater, and Current Creeks extending out into the valley any distance.

irregular intervals, sometimes but a few and again many miles apart, springs of various kinds and sizes are met with; some being hot and some cold, some pure and others mineralized, a few being of great size and depth and discharging a large volume of water. One of these, at the "Blue Eagle" Ranch, forty miles south of White Pine, sends off a sufficiency of water to keep over a thousand acres of meadow land constantly irrigated. The reflection of the rays of light from a species of alge, of a bright green color, growing on the bottom and sides of this spring fills its water with opalescent hues of the most beautiful description—a peculiarity of several other springs in the neighborhood. The thermals of this region occur mostly in groups; are of all temperatures, ranging from blood heat to boiling point; occupy generally an extensive mound formed by the depositions of their own waters and appear in many instances to be abating in action and volume, some having already become extinct.

We have been more minute in our description of Railroad Valley because of its central position and vast extent; and because, having already become a considerable thoroughfare it promises to serve as the future channel of railroad communication across this part of the State, while possessing nearly every diversity of feature common to the other large valleys of central Nevada, so full a description of it renders further remark upon the latter superfluous. In regard to

The Mountain System

Of this portion of the State, it may be observed that the longitudinal axis of the several chains composing it have a generally north and south strike; that they usually run with much regularity in that direction, being separated from each other by broad parallel valleys, and that though often straggling and much spread out, they are, for the most part, confined to a single ridge or succession of ridges, separated from each other by deep depressions that afford easy passage across them.

These mountains, which are nearly everywhere steep and often precipitous, have an altitude varying from two to five thousand feet above the adjacent valleys; the latter being elevated about 6,000 feet above the sea-level. The sides of these mountains are cut by ravines and deep gorges, through some

of which flow small and in a few instances considerable streams of water. They are covered with a sparse growth of bunch grass; about one-half their surface being timbered with scattered forests of piñon, mountain mahogany and other scraggy trees; there being also, in a few places, groves of white pine and fir of larger size and suitable for making lumber. This better quality of timber is confined, however, mostly to the White Pine Range and a few other ranges lying further east. These mountains being the repositories of the precious metals, to them, of course, all explorations directed to the discovery of this species of wealth are confined; and it seems probable that the entire region stretching south and east from White Pine will become the field of very active and extended research the ensuing summer. Already, what are believed to be valuable discoveries, have been made, and several mining districts have been organized in that quarter; though, owing to the lateness at which the work of prospecting was commenced last season, no very thorough examination of that section of country has yet been made; wherefore it would be premature to pronounce a positive opinion upon its metalliferous wealth.

The Climate of Central and Eastern Nevada

“Does not differ much from that common to the whole of the Great Basin; the year being divided into a wet and a dry season, with an aggregate annual precipitation comparatively limited; neither the rain nor the snowfall being anything like what it is in northern or middle California. Some flurries of snow occur in the months of October and November, with occasional deep falls through the succeeding four months, and even along through April and May, though these latter soon disappear before the heat of the sun. The depth of the snow depends altogether on altitude; there being, perhaps, eight or ten feet on the higher mountains when there is none in the valleys. In fact, not more than a few inches ever accumulate in the latter even during the most severe winter weather, nor is it apt to lie more than a week or two at a time. Cattle receive no fodder during the winter, snow never falling to a sufficient depth to cover up the grass altogether. For a few days the cold will sometimes be intense, the thermometer falling to sixteen or eighteen degree

below zero; after which, the weather will moderate, and for several days the temperature will scarcely fall below freezing point. The wind is apt to blow furiously at times, and a cold mist often gathers about the mountains, so penetrating that nothing can resist its chilling influence. During the months of May, June and July, heavy showers, sometimes accompanied by thunder and lightning, are frequent on the mountains, reaching also more or less into the valleys. From the latter part of July to the middle of November there is but little precipitation whether of snow or rain; the entire amount of moisture during these eighteen months aggregating less than half an inch. The weather during the latter part of June, through the months of July, August and the most of September, is warm and often very hot during the day; the nights being, as in California, uniformly cool and occasionally frosty.

Routes of Approach to White Pine.

"Persons desirous of reaching this district from an easterly or a westerly direction, will come over the Central Pacific Railroad to Elko, and thence by stage 110 miles to Hamilton, the present southern terminus of the stage route. Parties starting from almost any part of California should go by railroad, unless intending to travel by their own conveyance. Where the latter is the case, any of the more convenient routes leading over the Sierra Nevada may be taken, after which the old Overland Road, *via* Austin, is to be followed to the Dry Well's Station, where the overland route is left, the White Pine road bearing off to the southeast. After leaving the Sierra Nevada mountains, the route leads mostly through a dry and barren country, along which there is but little wood, grass, or water, rendering travel across it tedious and wearisome. The distance from Carson valley to White Pine is about 300 miles by this route, the time required for making it by wagons being from fifteen to twenty days, though horsemen should make it in a little more than half that time. There are a number of spots of heavy sand along the route and many places that are apt to be miry in the spring, with several dry stretches to be crossed, over which water must be carried. Coming in from the southerly direction, parties will experience little difficulty in reaching White Pine, the long,

open valleys stretching out toward that quarter affording easy avenues of approach."

Discovery and Organization of the District.

The first discovery of silver-bearing lodes within the limits of the White Pine District was made in the fall of 1865, being on the west side of Pogonip Mountain, near where the Monte Cristo mill now stands; distant some fourteen miles from the town of Hamilton. The ledges here found, though not remarkable for either the quantity or the high grade of the ores they carried, were considered sufficiently valuable to induce the parties who had located them to proceed with the work of their development, and to finally erect a mill for the working of them. On the 10th day of Oct., 1865, a meeting was convened after the usage of miners, whereat a district was organized and a code of local laws adopted, under which, as subsequently amended, all claims since taken up in the district have been located and held. The leading features of this code are as follows: each locator is allowed 200 feet on a lode, the discoverer being allowed 200 feet additional. A notice must be posted on the claim at the time of taking it up, which must be filed with the Recorder for record within ten days from the time it is posted. Two days' work must be done on each company claim within forty days after location. The Recorder is entitled to receive fifty cents for each locator's name put on record, and the same for making a survey of work done, and two dollars for putting the whole on record. For furnishing a transcript of record, same fee as for recording.

First Locations made on Treasure Hill.

In the month of July, 1867, A. J. Leathers, a blacksmith in the employ of the Monte Cristo Company, having been shown by an Indian a piece of rich ore, accompanied him to the spot where he had obtained it, which proved to be upon the top of Treasure Hill and within the limits of the claim now known as the Rathburn mine, and at present the subject of dispute between this and the original Hidden Treasure Company. On this occasion Leathers did no work, put up no notice, and in fact, made no location. In the month of September following, however, he

returned to this spot and posted a notice of location, taking up 600 feet upon the lode, the other claimant being one Marchsand. This notice was placed at a point near the main workings of the present original Hidden Treasure Company and about 200 feet from the north end of their claim. Having done this, without performing any work upon his ground, Leathers returned to Monte Cristo, where he remained until the third day of November when he again revisited the spot. On his arrival he found that Rathburn and Alderson had preceded him, having put up a notice about 100 feet north of his, but upon the same cropings, claiming 600 feet of the lode, and covering all but about 100 feet at the south end of Leathers' claim; these men being engaged at the time Leathers came back doing the work necessary to perfecting their title under the laws of the district. On the 14th of Nov. both notices were recorded; that of Rathburn and Alderson having precedence on the book of records. With these facts established in the evidence, it is clear to see how the issue pending between these parties must result. This, next to the Eberhardt is one of the most notable pieces of mining ground in the district, and it is much to be regretted that its value should have so long suffered depreciation from this cloud upon its title.

The location of the Rathburn claim was followed by several others in the vicinity; the notice upon the great Eberhardt mine not having been posted till January 3d, 1868, while those upon the Keystone, Blue Bill and the Grey Eagle, all now consolidated with the Eberhardt, were not put up till the 12th of May, and the Richmond notice not until the 19th day of June following.

Yield of Ores, Product of Bullion, Mills in Operation, Etc.

The following well authenticated statements, being mostly derived from the County Assessor's reports, furnish sufficient evidence of the high grade of the White Pine ores—the results detailed being without a parallel in the history of mining on this coast. Many of the crushings, as will be perceived, are small; there having been no facilities for the reduction of larger amounts, while the object was in most cases merely the obtainment of a practical mill-test of the ore. Below are the returns

of a few of the leading mines on Treasure Hill, for the quarter ending December 31st, 1868.

	Tons.	Lbs.	Av. per T.
Eberhardt.....	476	1,749	\$774 00
Keystone.....	80	90	554 00
Santa Rita.....	26	224 00
Hidden Treasure.....	80	1,990	337 00
Snowdrop.....	8	837	547 61
Aurora South.....	337	1,838	145 09
Aurora North.....	4	1,012	510 66
Hudson & Logan.....	3	1,630	371 44
Stonewall.....	68	257	434 03
Romulus.....	8	213	272 72
Montröse.....	24	1,724	87 24
Eclipse.....	13	1,216	435 28
Last Chance.....	18	1,315	313 51
Argyle.....	10	1,040	53 52
Highland Chief.....	2	1,000	168 28
Best Chance.....	1	622	131 92
Buena Vista.....	1	404	91 85
Mon'gomery.....	17	1,585	323 52
Charter Oak.....	1	211	103 88
Robert Emmet.....	172	992	857 77
Glazier.....	6	1,658	170 97
Indiana South.....	8	1,101	160 81
Indiana North.....	3	187	344 77
California.....	5	1,121	280 07
Palm.....	6	1,995	126 39
Empire.....	4	600	1,007 37
Genessee.....	6	1,738	464 12
Stamboul.....	2	1,354	221 15
Emersley.....	8	1,547	464 83
Seymour.....	8	1,547	327 07
Delmonico.....	9	648	87 95
Eunice.....	9	163	116 85
Hidden Treasure, Ex.....	14	470	186 36

Showing a total of 1,492 tons of ore, worked with an average yield of \$306 to the ton, making an aggregate of \$456,542. During the preceding portion of the year 1868 there was produced at the Manhattan mill in Austin, the Monte Cristo mill and the Centenary Company's mill at Newark, at least \$300,000, the product of the present year being estimated at \$700,000; making a total production of bullion, from the White Pine mines for the first year of their development, of very nearly one and a half million of dollars. For nearly one half this time there was

of a mill running in the district, and not until quite recently were there more than twenty-five stamps in operation.

The assays of ores in this district give very high average results. Of three thousand tests of this kind more than one third exceeded \$500 to the ton; many went over \$10,000, several over 20,000, and one, the largest result obtained, indicated for the ore a value of \$23,170.

There are now nine mills running in White Pine, carrying an aggregate of 170 stamps, besides the Centenary mill of twenty stamps at Newark, also running on ores from this district. In addition to these there are four mills in process of construction, some of them of large capacity, and several others projected; or, for the erection of which the preliminary steps have been taken. The cost of working ores at the custom mills having been reduced from fifty to twenty-five dollars per ton, the grade of the ores milled has gradually declined, until from a little over \$300 they have fallen to about \$150 per ton, of which class there are now immense quantities awaiting means of reduction.

Progress Made During the Past Year.

It is just about one year since the rich discoveries at White Pine began to be noised abroad; and scarcely more than two-thirds of that time since population and capital began to flow actively into that district. A mere allusion to the leading improvements that have been made there during that brief period, throughout more than half of which the weather was so inclement that little could be done, shows that the money invested has not been thrown away nor the people been idle. As before stated, then, over a dozen quartz mills, several of them of large capacity, have been constructed and the most of them set running. Three considerable towns have been built up—the whole capable of accommodating a population of over 10,000. Extensive wagon roads have been made, the more costly portions being within the limits of the district, and the whole costing not less than \$150,000. A magnificent scheme for supplying water to the towns and quartz mills has been nearly carried out—only a month or two more being required for its entire completion. Several considerable smelting works have been erected and gotten under way; saw mills have been built and lum-

ber in immense quantities manufactured; stone quarries have been opened; a foundry and other industrial establishments have been started and miles of pipe have been laid down for conducting water from the springs to the mills. Besides accomplishing all this in so short a space of time and under such adverse circumstances, White Pine has become the colonizer of other districts, wherein considerable communities have been gathered, and important improvements have been made.

OUTSIDE DISTRICTS.

Among these we have, first going south, the Grant District, lying on the westerly slope of the White Pine Mountains about sixty miles south of Hamilton, the county seat. The district is well timbered with piñon and mohogany, containing also some little white pine, and is moderately well supplied with water, several small streams flowing down the ravines that furrow its surface at short intervals. The ledges are large and easily traced, and for the most part carry a good supply of ore, the latter consisting of the chlorides and sulphurets of silver, and in many instances being charged with a notable per centage of gold. A town named after the district has been laid out on an eligible site, and considerable work done upon the ledges. Steps have also been taken for the erection of a mill in the district, which at the present time contains about fifty inhabitants. The country rock here consists mainly of lime stone and slate.

Troy District

Adjoins Grant on the south, and, centrally considered, is about seventy-five miles from Hamilton. The ledges here, though not numerous, are large, well defined and metalliferous to a high degree. They have a northerly and southerly strike, and pitch east into the mountain at an angle of about 65 degrees. A good deal of work has been done on several of them, one or two having been stripped for a length of 500 feet, showing throughout this entire distance an unbroken belt of vein-matter. Numerous tests, both by assay and mill working, have been made of the ore, and uniformly with excellent results. Timber here is very abundant, including groves of small cottonwood growing

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the cañons and forests of white pine and fir, suitable for lumber. There is also much grass and an abundance of several fine streams coursing across the district. About the valuable ledges here, as well as the choice wood lands all the water privileges belong to a single company, who owns these several properties one of the most valuable mining districts in the country. Measures are on foot looking to an early development of these mines, and the erection of a mill for the treatment of their ores. The geological formation is similar to that of the Grant District, with the addition of some gneiss and mica.

Reveille District,

lies 110 miles S. S.W. of Hamilton, was organized in 1866. The ledges are numerous and, though not so regular and massive as in many other parts of the country, carry a valuable class of ores, the prevailing type being chlorides and carbonates with a good deal of horn silver. At the time this district was discovered there was a prevailing distrust of veins of silver in lime rock, the predominant formation here; the natural value of the chloride ores being then also less understood than at present. The prosperity of Reveille was moreover retarded by the want of suitable reduction works, the only mill ever taken into the district consisting of a small and inefficient concern, whereby one half of the metal was lost. During the past few months quite a number of miners have been gathering into Reveille, which promises to be an active district in the coming season. Considerable amounts of capital, attracted by the rich character of the ores, have also been invested of late; there is no doubt but the erection of one or two mills will soon follow. Timber is here in fair supply, but iron is scarce; the mill alluded to having on this account been located some ten or twelve miles from the mines. About twenty-five miles to the southwest of Hamilton lie

The Morey and the Hot Creek Districts.

lie on the east side of the Hot Creek Range of Mount-ain, adjoining each other—Morey being the furthest north. As the water and fuel they are favorably conditioned. Hot water is a large stream, flowing from the mountains eastwardly

into the valley, and several other rivulets coursing through the cañons adjacent to the mines. The forests consist of piñon, mahogany and a few large white pines. The ores here, consisting mostly of the chlorides and sulphides of silver, are of a high grade, milling from two to three hundred dollars per ton. The veins are numerous in the foothills, with large chimneys and pockets in the limestone formation higher up the mountain. The old Dominion Company put up a mill here two or three years ago, which after running a short time was burnt, extinguishing the then flattering prospects of the district. A small company of men have remained in these places, and there is a strong probability that the business of mining will be actively resumed there in the course of another year.

The Tem-Piute District,

A recent discovery, is situated upon the southerly slope of a high and rugged mountain, at a point about 150 miles south of Hamilton. Two masterly lodes, with many subordinate ones, strike northerly and southerly across this mountain, on which there is but little water or timber. So far as the assays go, the ores indicate fertile deposits; and although many of the ledges are sharply and well defined, sufficient work has not yet been done to determine their exact size or probable continuity. There are at present about 100 men in the District, leading to which there is a good wagon road all the way from Hamilton.

About 80 miles S.E. of Hamilton lies

The Patterson District,

Was organized during the past winter, and now contains 400 inhabitants. Two towns, Montezuma and Springville have been laid out near the mines, and a considerable amount of work has been done on the latter. The ledges are large and so far as opened exhibit satisfactory signs of wealth. The surface ores have generally assayed well, ranging from \$50 to \$2,000 per ton. The country is finely wooded with nut and yellow pine, cedar and mahogany, and although there are no large streams, there are several springs in the vicinity of the mines, and water can be obtained by digging almost any where in the district.

Lying to the south of Patterson, in the same range of mountains, are

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The Ely and the Fairview Districts,

one being distant from Patterson about twenty-five and the other fifty miles. They abound with silver-bearing lodes, many of which carry in their surface ores evidence of their richness, but sufficient work has not yet been done upon them to determine their real value. As in the Patterson District, there is an abundance of bunch grass on the mountains, with large tracts of fine farming lands in the adjacent valleys. Ten miles from Fairview there is a large Mormon settlement, containing about sixty or seventy families, from whence and from other communities of these people not far distant, the miners throughout the region obtain their provisions at moderate prices.

The Robinson District

located about thirty-five miles E. N. E. of Hamilton, with which it is connected by a fine wagon road. Besides a great extent of valuable mines, this district possesses many natural advantages, such as ample supplies of water and timber, good soil and extensive tracts of rich agricultural lands in close proximity to the mines. The mountains here are covered with a luxuriant growth of bunch grass, affording immense pasture lands, while the valleys abound with large tracts of fertile grain and meadow lands. The ledges are numerous, and although the thickness of ore do not run as high as in some other districts, the mineral deposits are large and give every assurance of permanence. Among other advantages peculiar to this locality, is the presence of ample water power for the propulsion of machinery, thereby enabling millmen to reduce ores at such low rates as will enable them to insure much custom work from Snake, Silver, Cañon and other Districts. Samuel Brannan, of San Francisco, having recently invested largely in this district, business of all kinds has become very active here. This gentleman, with characteristic energy, has already set on foot a variety of important projects; one of which is the construction of a 20-stamp mill, to be driven by water and completed at the earliest practicable date.

The next range of mountains, east of Robinson, are the **Monte, Silver Canon, Snake and Shoshone Districts**, in the order mentioned, being on the north. They abound

in metalliferous veins and are well timbered and watered. There are also fine tracts of agricultural and grazing lands in the vicinity of the mines—this being one of the best farming regions in the eastern part of the State. So rapidly do the cereals grow here, that the Indians have been in the habit of cultivating them in their rude manner with success. There are as yet but few inhabitants in this section, but with the many inducements it offers for settlement, it must soon gather to it a large and thrifty population. Lying south of this group of districts, and distant from Hamilton about 150 miles in a S. S. E. direction, is

The Pahranaġat District,

Into which quite a numerous population was drawn several years ago, at which time much work was expended upon the mines. Towns were also laid out and mills erected, but the heavy expenses under which operations had to be carried on, owing to the cost of freight, defeated these premature efforts at developing the resources of the district, which was afterward almost wholly abandoned. As the mines are believed to be good, and there are many facilities for insuring an economical reduction of the ores, it is not improbable that endeavors will be made to reinstate operations there at an early day.

The Newark District,

Situate on the eastern slope of the Diamond Mountains, is distant from Hamilton thirty miles in a N. N. W. direction. It was organized in 1864, since which time a considerable amount of work has been performed on two or three of the more prominent ledges, and a first class 20-stamp quartz mill has been put up in the district. This mill has been running for the past year mostly on White Pine ores, it having previously been engaged crushing ores from the mines of the Centenary Company, to whom it belongs. Not much work has been done in the district of late; and notwithstanding it is of easy access, has wood and water in fair supply, and at least three or four moderately good ledges, it is not likely to soon become the theatre of active mining industry, unless further mineral developments of note should meantime be made.

Lying on the opposite side of the Diamond Range and a little further south is

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The Pinto District,

h, though but lately organized, bids fair to soon outstrip her outside districts, and even rival White Pine itself. The lodes here are wonderfully massive and the ores, as shown by numerous crucible and mill tests, of a very high grade. The most important mines in the district are the property of the Pinto Mining Company, incorporated with a capital of \$5,000,000 and embracing among its stockholders many of the most energetic business men and capitalists of San Francisco. The mines owned by this corporation consists of the Donquette, the Virginia, Our Own Nos. 1 and 2, the Montgomery, and the Crown Point lodes, all masterly veins and of unquestioned fertility, constituting as a whole one of the most valuable properties outside of the White Pine District. These mines are now in process of active development, a large working force being employed by the company and considerable quantities of ore being sent to the Centenary mill, eleven miles distant. A town, named Silverado has been laid out here upon a conspicuous and desirable site, and as the district is of easy approach has the advantage of ample supplies of wood and water. With plenty of capital to aid in its speedy development, there is no doubt but that it will in a short time become distinguished for its cheap and abundant product of the precious metals.

Joining Pinto on the south, and on the same side of the mountain, lies

The Eureka District,

known for its vast and numerous deposits of argentiferous galena for the reduction of which extensive smelting works have recently been erected. The lodes here were first discovered and the district organized nearly five years ago; but the base and refractory character of the ores prevented efficient efforts being made to work them until within the past year. During the winter a company of capitalists bought up the greater part of the most promising lodes in the district, and are now engaged experimenting upon the ores with a view of ascertaining the best methods for their treatment. That they will in due time achieve success is beyond admittance, and it is confidently expected by those best acquainted with the resources of Eureka, that it will in a short time rank among the most prolific of our many billion producing districts.

TABLE OF DISTANCES.

The distances indicated in the following table, though mostly based on mere estimate, are in some instances the result of actual measurement, approximately correct:

From San Francisco to White Pine, Carson Valley and Austin.

	Miles.
San Francisco to Sacramento.....	120
Sacramento to Carson Valley.....	141
Carson Valley to Austin.....	187
Austin to Dry Creek Station.....	32
Dry Creek Station to Pinto Creek.....	58
Pinto Creek to Hamilton.....	50
Total.....	588

San Francisco to White Pine, via Central Pacific Railroad.

	Miles.
San Francisco to Sacramento, <i>via</i> boat to Vallejo.....	30
Thence by California Pacific Railroad to Sacramento.....	60
Total.....	90
Or, <i>via</i> Sacramento River boat.....	120

Sacramento to Elko, via Central Pacific Railroad.

SACRAMENTO TO—	Miles.
Arcide.....	7
Antelope.....	8 15
Junction.....	3 18
Rocklin.....	4 22
Newcastle.....	9 31
Auburn.....	5 36
Clipper Gap.....	7 43
Colfax.....	11 54
Gold Run.....	10 64
Dutch Flat.....	3 67
Alta.....	2 69

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	Miles.
non.....	9 78
t Gap.....	6 84
.....	8 92
.....	13 105
.....	14 119
ittle Truckee).....	9 128
INE.....	10 138
.....	5 143
.....	11 154
.....	20 174
rth.....	15 189
ings.....	19 208
lains.....	15 223
dt Lake.....	10 233
dt Bridge.....	22 255
ch.....	17 272
dt City.....	12 284
.....	12 296
ek.....	18 314
ucca.....	10 324
la.....	17 341
ouse.....	22 363
.....	33 396
ne Point.....	11 407
y Ford.....	15 422
.....	13 435
.....	10 445
.....	15 460

Elko to Hamilton.

	Miles.
o- Creek.....	15
Wells.....	35 50
.....	30 80
on.....	30 110

Recapitulation.

	Miles.
RANCISCO to- ento.....	120
.....	460 580
on.....	110 690

**Salt Lake City to White Pine, via Central Pacific
Railroad.**

SALT LAKE CITY TO—	Miles.
Ogden City, by stage.....	49
Brigham City.....	21
Bear River.....	3
Promontory Mountain.....	29
Monument Point, north end of Great Salt Lake.....	27
Red Dome Pass.....	24
Terrace Point.....	20
Passage Creek.....	32
North Pass.....	26
Independence Springs.....	23
Humboldt Wells.....	15
Bishop Creek.....	14
North Fork Humboldt River.....	21
Elko.....	25
Hamilton.....	110

Salt Lake City to White Pine, via Overland Stage Route.

SALT LAKE CITY TO—	Miles.
Fort Crittenden.....	42
Fish Springs.....	99
Deep Creek.....	52
Egan Cañon.....	68
Ruby Valley.....	41
Jacob's Wells.....	7
Hamilton.....	60

**Distances from Hamilton to places in the vicinity and
prominent points in different parts of the State.**

HAMILTON TO—	Miles.
Treasure City.....	2 $\frac{1}{2}$
Shermantown.....	3 $\frac{1}{2}$
Eberhardt City.....	5
Pocotillo.....	3
Clove.....	6 $\frac{1}{2}$
Duckwater.....	30

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Eureka
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Center
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Gilson
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Ilapal
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HAMI
Browl
Robin
Murry
Hulet
Snake
Hulet

	Miles.
Creek.....	35
n (White) Creek.....	39
agle Ranch.....	42
District.....	60
istrict.....	70
e District.....	110
reek District.....	70
District.....	60
agat District.....	140
e.....	220
a Valley.....	110
Valley.....	80
ield's Salt Bed.....	45
's Saw Mill.....	74
nt.....	130
City.....	275
.....	120
.....	110
a Well, nearest station on Overland Stage Route....	60
Valley.....	65
Cañon.....	70
a District.....	30
nd District.....	30
ary Mill.....	30
Cristo Mill.....	16
's Ranch.....	40
Creek.....	30
h Creek.....	3

Hamilton to the Snake Mountain, via the Robinson District.

	Miles.
ILTON to—	
's or Harris' Ranch.....	14
son District.....	25
y Creek.....	3
's Ranch—Steptoe Valley.....	5
Mountain District.....	45
's Ranch to Patterson District.....	40

Table of Altitudes.

	Feet.
Hami'ton.....	8,200
Shermantown.	7,600
Eberhardt City.....	7,400
Treasure City.....	9 100
Summit of Treasure Hill.....	9,400
White Pine City.....	8,800
Eberhardt Mine.....	8,825
Stanford Mine.....	9,150
Pogonip Mountain.....	10,700
Summit (highest point on Central Pacific Railroad).....	7,042
Truckee.....	5,866
Reno.....	4,525
Wadsworth.....	4,104
Humboldt Lake.....	3,900
Winnemucca.....	4,355
Argenta.....	4,575
Carlin.....	4,930
Elko.....	5,052
Humboldt Wells.....	5,650
Monument Point.....	4,290
Echo City.....	5,764
Sherman (highest point on Union Pacific Railroad).....	8,424
Railroad Valley (average elevation).....	5,500
Gilson's Valley.....	6,064
Ruby Valley.....	5,800
Simpson's Pass.....	7,505

